

What is claimed is:

1 1. A broadcast apparatus for broadcasting broadcast data
2 comprising:

3 acquiring means for acquiring first broadcast data
4 and a reproduction time period in which the first broadcast
5 data is to be reproduced by a reception apparatus; and

6 broadcasting means for repeatedly broadcasting the
7 first broadcast data from a specific time to an end of
8 the reproduction time period, the specific time being a
9 point in time before a start of the reproduction time period,
10 and a time period between the specific time and the start
11 of the reproduction time period being a predetermined time
12 period.

1 2. The broadcast apparatus of claim 1, wherein

2 the acquiring means further acquires second
3 broadcast data which is to be reproduced before the first
4 broadcast data, and

5 the broadcasting means repeatedly broadcasts the
6 second broadcast data until the specific time.

1 3. The broadcast apparatus of claim 2,

2 wherein the broadcasting means broadcasts the
3 second broadcast data on a predetermined bandwidth until
4 the specific time and broadcasts the first broadcast data
5 on the predetermined bandwidth from the specific time.

1 4. The broadcast apparatus of claim 1, wherein
2 the acquiring means further acquires second
3 broadcast data which is to be reproduced before the first
4 broadcast data, and
5 the broadcasting means repeatedly broadcasts the
6 second broadcast data until the start of the reproduction
7 time period.

1 5. The broadcast apparatus of claim 4,
2 wherein the broadcasting means broadcasts the
3 second broadcast data on a predetermined bandwidth until
4 the specific time and broadcasts the second broadcast data
5 and the first broadcast data on the predetermined bandwidth
6 from the specific time to the start of the reproduction
7 period.

1 6. The broadcast apparatus of claim 4,
2 wherein the broadcasting means broadcasts the
3 second broadcast data on a predetermined bandwidth until
4 the specific time and broadcasts the second broadcast data
5 on the predetermined bandwidth from the specific time to
6 the start of the reproduction period.

1 7. The broadcast apparatus of claim 1 further comprising:
2 cache instruction broadcasting means for
3 broadcasting a cache instruction before the start of the
4 reproduction time period, the cache instruction

5 instructing the reception apparatus to cache the first
6 broadcast data; and

7 reproduction instruction broadcasting means for
8 broadcasting a reproduction instruction during the
9 reproduction time period, the reproduction instruction
10 instructing the reception apparatus to reproduce, when
11 the first broadcast data has been cached according to the
12 cache instruction, the cached broadcast data.

1 8. The broadcast apparatus of claim 7, wherein
2 the cache instruction broadcasting means
3 broadcasts the cache instruction to instruct the reception
4 apparatus to perform the caching by accumulating the first
5 broadcast data, and

6 the reproduction instruction broadcasting means
7 broadcasts the reproduction instruction to instruct the
8 reception apparatus to reproduce, (a) when the first
9 broadcast data has been accumulated according to the cache
10 instruction, the accumulated broadcast data, and (b) when
11 the first broadcast data has not been accumulated according
12 to the cache instruction, the first broadcast data
13 broadcast by the broadcasting means.

1 9. The broadcast apparatus of claim 7, wherein
2 the cache instruction broadcasting means
3 broadcasts the cache instruction to instruct the reception
4 apparatus to perform the caching by storing the first

5 broadcast data into a cache memory when the first broadcast
6 data has been stored in a predetermined storage medium,
7 and

8 the reproduction instruction broadcasting means
9 broadcasts the reproduction instruction to instruct the
10 reception apparatus to reproduce, (a) when the first
11 broadcast data has been stored in the cache memory according
12 to the cache instruction, the first broadcast data stored
13 in the cache memory, and (b) when the first broadcast data
14 has not been stored in the cache memory according to the
15 cache instruction, the first broadcast data stored in the
16 predetermined storage medium or the first broadcast data
17 broadcast by the broadcasting means.

1 10. A broadcast apparatus for multiplexing and broadcasting
2 program data which is to be reproduced by a reception
3 apparatus soon after receipt and additional data which
4 corresponds to the program data, the broadcast apparatus
5 comprising:

6 acquiring means for acquiring first program data,
7 first additional data corresponding to the first program
8 data, a broadcast time period of the first program data,
9 and second program data which is to be broadcast before
10 the first program data;

11 multiplexing means for repeatedly multiplexing the
12 first additional data with the second program data from
13 a specific time to a start of the broadcast time period

14 and repeatedly multiplexing the first additional data with
15 the first program data during the broadcast time period,
16 the specific time being a point in time before the start
17 of the broadcast time period, and a time period between
18 the specific time and the start of the broadcast time period
19 being a predetermined time period; and
20 broadcasting means for broadcasting the data
21 multiplexed by the multiplexing means.

1 11. The broadcast apparatus of claim 10, wherein
2 the acquiring means further acquires second
3 additional data corresponding to the second program data,
4 and
5 the multiplexing means repeatedly multiplexes the
6 second additional data with the second program data until
7 the specific time.

1 12. The broadcast apparatus of claim 11,
2 wherein the multiplexing means performs the
3 multiplexing for the second additional data on a
4 predetermined bandwidth until the specific time and
5 performs the multiplexing for the first additional data
6 on the predetermined bandwidth from the specific time.

1 13. The broadcast apparatus of claim 10, wherein
2 the acquiring means further acquires second
3 additional data corresponding to the second program data,

4 and

5 the multiplexing means repeatedly multiplexes the
6 second additional data with the second program data until
7 the start of the broadcast time period.

1 14. The broadcast apparatus of claim 13,

2 wherein the multiplexing means performs the
3 multiplexing for the second additional data on a
4 predetermined bandwidth until the specific time and
5 performs the multiplexing for the second additional data
6 and the first additional data on the predetermined
7 bandwidth from the specific time to the start of the
8 broadcast time period.

1 15. The broadcast apparatus of claim 13,

2 wherein the multiplexing means performs the
3 multiplexing for the second additional data on a
4 predetermined bandwidth until the specific time and
5 performs the multiplexing for the second additional data
6 on the predetermined bandwidth from the specific time to
7 the start of the broadcast time period.

1 16. The broadcast apparatus of claim 10 further comprising:

2 cache instruction broadcasting means for
3 broadcasting a cache instruction before the start of the
4 broadcast time period, the cache instruction instructing
5 the reception apparatus to cache the first additional data;

6 and
7 use instruction broadcasting means for
8 broadcasting a use instruction after the start of the
9 broadcast time period, the use instruction instructing
10 the reception apparatus to use, when the first additional
11 data is cached according to the cache instruction, the
12 cached additional data.

1 17. The broadcast apparatus of claim 16, wherein
2 the cache instruction broadcasting means
3 broadcasts the cache instruction to instruct the reception
4 apparatus to perform the caching by accumulating the first
5 additional data, and
6 the use instruction broadcasting means broadcasts
7 the use instruction to instruct the reception apparatus
8 to use, (a) when the first additional data has been
9 accumulated according to the cache instruction, the
10 accumulated first additional data, and (b) when the first
11 additional data has not been accumulated according to the
12 cache instruction, the first additional data broadcast
13 by the broadcasting means.

1 18. The broadcast apparatus of claim 16, wherein
2 the cache instruction broadcasting means
3 broadcasts the cache instruction to instruct the reception
4 apparatus to perform the caching by storing the first
5 additional data into a cache memory when the first

6 additional data has been stored in a predetermined storage
7 medium, and

8 the use instruction broadcasting means broadcasts
9 the use instruction to instruct the reception apparatus
10 to use, (a) when the first additional data has been stored
11 in the cache memory according to the cache instruction,
12 the first additional data stored in the cache memory, and
13 (b) when the first additional data has not been stored
14 in the cache memory according to the cache instruction,
15 the first additional data stored in the predetermined
16 storage medium.

1 19. The broadcast apparatus of claim 10, wherein

2 the acquiring means further acquires second
3 additional data corresponding to the second program data
4 and a broadcast time period of the second program data,
5 the broadcast apparatus further comprises judging
6 means for judging whether the broadcast time period of
7 the second program data is longer than a predetermined
8 criterion time period, and

9 the multiplexing means,

10 (a) when the judging means judges that the broadcast
11 time period of the second program data is longer than the
12 predetermined criterion time period, repeatedly
13 multiplexes the second additional data with the second
14 program data until the specific time, repeatedly
15 multiplexes the first additional data with the second

16 program data from the specific time to the start of the
17 broadcast time period of the first program data, and
18 repeatedly multiplexes the first additional data with the
19 first program data during the broadcast time period of
20 the first program data, and

21 (b) when the judging means judges that the broadcast
22 time period of the second program data is no longer than
23 the predetermined criterion time period, repeatedly
24 multiplexes the second additional data with the second
25 program data until the specific time, repeatedly
26 multiplexes the second additional data and the first
27 additional data with the second program data from the
28 specific time to the start of the broadcast time period
29 of the first program data, and repeatedly multiplexes the
30 first additional data with the first program data during
31 the broadcast time period of the first program data.

1 20. The broadcast apparatus of claim 10, wherein
2 the acquiring means further acquires second
3 additional data corresponding to the second program data
4 and a broadcast time period of the second program data,
5 the broadcast apparatus further comprises judging
6 means for judging whether the broadcast time period of
7 the second program data is longer than a predetermined
8 criterion time period, and
9 the multiplexing means
10 (a) repeatedly multiplexes the second additional

11 data with the second program data until the specific time
12 so that a bandwidth for the second additional data is
13 allocated to a predetermined bandwidth,

14 (b) when the judging means judges that the broadcast
15 time period of the second program data is longer than the
16 predetermined criterion time period, repeatedly

17 multiplexes the first additional data with the second
18 program data from the specific time to the start of the
19 broadcast time period of the first program data so that
20 a bandwidth for the first additional data is allocated
21 to the predetermined bandwidth, and repeatedly multiplexes
22 the first additional data with the first program data during
23 the broadcast time period of the first program data, and

24 (c) when the judging means judges that the broadcast
25 time period of the second program data is no longer than
26 the predetermined criterion time period, so that a total
27 bandwidth for the second additional data and the first
28 additional data is allocated to the predetermined bandwidth,
29 repeatedly multiplexes the second additional data and the
30 first additional data with the second program data from
31 the specific time to the start of the broadcast time period
32 of the first program data, and repeatedly multiplexes the
33 first additional data with the first program data during
34 the broadcast time period of the first program data.

1 21. The broadcast apparatus of claim 10, wherein
2 the first additional data acquiring means further

3 acquires second additional data corresponding to the second
4 program data and a broadcast time period of the second
5 program data,

6 the broadcast apparatus further comprises judging
7 means for judging whether the broadcast time period of
8 the second program data is longer than a predetermined
9 criterion time period, and

10 the multiplexing means

11 (a) repeatedly multiplexes the second additional
12 data with the second program data until the specific time
13 so that a bandwidth for the second additional data is
14 allocated to a predetermined bandwidth,

15 (b) when the judging means judges that the broadcast
16 time period of the second program data is longer than the
17 predetermined criterion time period, so that a bandwidth
18 for the first additional data is allocated to the
19 predetermined bandwidth, repeatedly multiplexes the first
20 additional data with the second program data from the
21 specific time to the start of the broadcast time period
22 of the first program data and repeatedly multiplexes the
23 first additional data with the first program data during
24 the broadcast time period of the first program data, and

25 (c) when the judging means judges that the broadcast
26 time period of the second program data is no longer than
27 the predetermined criterion time period, repeatedly
28 multiplexes the second additional data and the first
29 additional data with the second program data from the

30 specific time to the start of the broadcast time period
31 of the first program data so that a total bandwidth for
32 the second additional data and the first additional data
33 is increased by adding a bandwidth for the first additional
34 data to the predetermined bandwidth and repeatedly
35 multiplexes the first additional data with the first
36 program data during the broadcast time period of the first
37 program data so that a bandwidth for the first additional
38 data is allocated to the predetermined bandwidth.

1 22. The broadcast apparatus of any of claim 19, 20, and
2 21,

3 wherein, when the judging means judges that the
4 broadcast time period of the second program data is no
5 longer than the predetermined criterion time period, the
6 multiplexing means repeatedly multiplexes the second
7 additional data and the first additional data with the
8 second program data during the broadcast time period of
9 the second program data.

1 23. The broadcast apparatus of any of claim 19, 20, and
2 21 further comprising:

3 criterion time period determining means for
4 determining the predetermined criterion time period to
5 be used by the judging means by multiplying a time period
6 of a broadcast cycle of additional data by a predetermined
7 coefficient.

1 24. The broadcast apparatus of claim 10, wherein
2 the acquiring means further acquires second
3 additional data corresponding to the second program data
4 and a broadcast time period of the second program data,
5 the second additional data is updated during the
6 broadcast time period of the second program data,
7 the broadcast apparatus further comprises judging
8 means for judging whether a time period from the last update
9 time of the second additional data to the start of the
10 broadcast time period of the first program data is longer
11 than a predetermined criterion time period, and
12 the multiplexing means,
13 (a) when the judging means judges that the time
14 period from the last update time of the second additional
15 data to the start of the broadcast time period of the first
16 program data is longer than the predetermined criterion
17 time period, repeatedly multiplexes the second additional
18 data with the second program data until the specific time,
19 repeatedly multiplexes the first additional data with the
20 second program data from the specific time to the start
21 of the broadcast time period of the first program data,
22 and repeatedly multiplexes the first additional data with
23 the first program data during the broadcast time period
24 of the first program data, and
25 (b) when the judging means judges that the time
26 period from the last update time of the second additional

27 data to the start of the broadcast time period of the first
28 program data is no longer than the predetermined criterion
29 time period, repeatedly multiplexes the second additional
30 data with the second program data until the specific time,
31 repeatedly multiplexes the second additional data and the
32 first additional data with the second program data from
33 the specific time to the start of the broadcast time period
34 of the first program data, and repeatedly multiplexes the
35 first additional data with the first program data during
36 the broadcast time period of the first program data.

1 25. The broadcast apparatus of claim 10, wherein
2 the acquiring means further acquires second
3 additional data corresponding to the second program data
4 and a broadcast time period of the second program data,
5 the second additional data is updated during the
6 broadcast time period of the second program data,
7 the broadcast apparatus further comprises judging
8 means for judging whether a time period from the last update
9 time of the second additional data to the start of the
10 broadcast time period of the first program data is longer
11 than a predetermined criterion time period, and
12 the multiplexing means
13 (a) repeatedly multiplexes the second additional
14 data with the second program data until the specific time
15 so that a bandwidth for the second additional data is
16 allocated to a predetermined bandwidth,

17 (b) when the judging means judges that the time
18 period from the last update time of the second additional
19 data to the start of the broadcast time period of the first
20 program data is longer than the predetermined criterion
21 time period, repeatedly multiplexes the first additional
22 data with the second program data from the specific time
23 to the start of the broadcast time period of the first
24 program data so that a bandwidth for the first additional
25 data is allocated to the predetermined bandwidth and
26 repeatedly multiplexes the first additional data with the
27 first program data during the broadcast time period of
28 the first program data, and

29 (c) when the judging means judges that the time
30 period from the last update time of the second additional
31 data to the start of the broadcast time period of the first
32 program data is no longer than the predetermined criterion
33 time period, repeatedly multiplexes the second additional
34 data and the first additional data with the second program
35 data from the specific time to the start of the broadcast
36 time period of the first program data so that a total
37 bandwidth for the second additional data and the first
38 additional data is allocated to the predetermined bandwidth
39 and repeatedly multiplexes the first additional data with
40 the first program data during the broadcast time period
41 of the first program data.

1 26. The broadcast apparatus of claim 10, wherein

2 the acquiring means further acquires second
3 additional data corresponding to the second program data
4 and a broadcast time period of the second program data,
5 the second additional data is updated during the
6 broadcast time period of the second program data,
7 the broadcast apparatus further comprises judging
8 means for judging whether a time period from a last update
9 time of the second additional data to the start of the
10 broadcast time period of the first program data is longer
11 than a predetermined criterion time period, and
12 the multiplexing means
13 (a) repeatedly multiplexes the second additional
14 data with the second program data until the specific time
15 so that a bandwidth for the second additional data is
16 allocated to a predetermined bandwidth,
17 (b) when the judging means judges that the time
18 period from the last update time of the second additional
19 data to the start of the broadcast time period of the first
20 program data is longer than the predetermined criterion
21 time period, so that a bandwidth for the first additional
22 data is allocated to the predetermined bandwidth,
23 repeatedly multiplexes the first additional data with the
24 second program data from the specific time to the start
25 of the broadcast time period of the first program data
26 and repeatedly multiplexes the first additional data with
27 the first program data during the broadcast time period
28 of the first program data, and

29 (c) when the judging means judges that the time
30 period from the last update time of the second additional
31 data to the start of the broadcast time period of the first
32 program data is no longer than the predetermined criterion
33 time period, repeatedly multiplexes the second additional
34 data and the first additional data with the second program
35 data from the specific time to the start of the broadcast
36 time period of the first program data so that a total
37 bandwidth for the second additional data and the first
38 additional data is increased by adding a bandwidth for
39 the first additional data to the predetermined bandwidth
40 and repeatedly multiplexes the first additional data with
41 the first program data during the broadcast time period
42 of the first program data so that a bandwidth for the first
43 additional data is allocated to the predetermined
44 bandwidth.

1 27. The broadcast apparatus of any of claim 24, 25, and
2 26,

3 wherein, when the judging means judges that the time
4 period from the last update time of the second additional
5 data to the start of the broadcast time period of the first
6 program data is no longer than the predetermined criterion
7 time period, the multiplexing means repeatedly multiplexes
8 the second additional data and the first additional data
9 with the second program data during the time period from
10 the last update time of the second additional data to the

11 start of the broadcast time period of the first program
12 data.

1 28. The broadcast apparatus of any of claim 24, 25, and
2 26 further comprising:

3 criterion time period determining means for
4 determining the predetermined criterion time period to
5 be used by the judging means by multiplying a time period
6 of a broadcast cycle of additional data by a predetermined
7 coefficient.

1 29. The broadcast apparatus of claim 10, wherein
2 the acquiring means further acquires second
3 additional data corresponding to the second program data,
4 the broadcast apparatus further comprises judging
5 means for judging whether the broadcast time period is
6 shorter than a predetermined criterion time period, and
7 the multiplexing means,

8 (a) when the judging means judges that the broadcast
9 time period is shorter than the predetermined criterion
10 time period, repeatedly multiplexes the second additional
11 data with the second program data until the specific time,
12 repeatedly multiplexes the first additional data with the
13 second program data from the specific time to the start
14 of the broadcast time period, and repeatedly multiplexes
15 the first additional data with the first program data during
16 the broadcast time period, and

17 (b) when the judging means judges that the broadcast
18 time period is no shorter than the predetermined criterion
19 time period, repeatedly multiplexes the second additional
20 data with the second program data until the start of the
21 broadcast time period and repeatedly multiplexes the first
22 additional data with the first program data during the
23 broadcast time period.

1 30. The broadcast apparatus of claim 10, wherein
2 the acquiring means further acquires second
3 additional data corresponding to the second program data,
4 the first additional data is updated during the
5 broadcast time period of the first program data,
6 the broadcast apparatus further comprises judging
7 means for judging whether a time period from the start
8 of the broadcast time period to the first update time of
9 the first additional data is longer than a predetermined
10 criterion time period, and

11 the multiplexing means,

12 (a) when the judging means judges that the time
13 period from the start of the broadcast time period to the
14 first update time of the first additional data is shorter
15 than the predetermined criterion time period, repeatedly
16 multiplexes the second additional data with the second
17 program data until the specific time, repeatedly
18 multiplexes the first additional data with the second
19 program data from the specific time to the start of the

20 broadcast time period, and repeatedly multiplexes the first
21 additional data with the first program data during the
22 broadcast time period, and

23 (b) when the judging means judges that the time
24 period from the start of the broadcast time period to the
25 first update time of the first additional data is no shorter
26 than the predetermined criterion time period, repeatedly
27 multiplexes the second additional data with the second
28 program data until the start of the broadcast time period
29 and repeatedly multiplexes the first additional data with
30 the first program data during the broadcast time period.

1 31. The broadcast apparatus of any of claim 29 and 30 further
2 comprising:

3 criterion time period determining means for
4 determining the predetermined criterion time period to
5 be used by the judging means by multiplying a time period
6 of a broadcast cycle of additional data by a predetermined
7 coefficient.

1 32. The broadcast apparatus of claim 10, wherein

2 the acquiring means further acquires second
3 additional data corresponding to the second program data,
4 the broadcast apparatus has judgement information
5 which indicates whether the multiplexing for the first
6 additional data is to be started previous to the start
7 of the broadcast time period, and

8 the multiplexing means,

9 (a) when the judgement information indicates that
10 the multiplexing is to be started previously, repeatedly
11 multiplexes the second additional data with the second
12 program data until the specific time, repeatedly
13 multiplexes the first additional data with the second
14 program data from the specific time to the start of the
15 broadcast time period, and repeatedly multiplexes the first
16 additional data with the first program data during the
17 broadcast time period, and

18 (b) when the judgement information indicates that
19 the multiplexing is not to be started previously,
20 repeatedly multiplexes the second additional data with
21 the second program data until the start of the broadcast
22 time period and repeatedly multiplexes the first additional
23 data with the first program data during the broadcast time
24 period.

1 33. A broadcast apparatus for multiplexing and broadcasting
2 program data which is to be reproduced by a reception
3 apparatus soon after receipt and additional data
4 corresponding to the program data, the broadcast apparatus
5 comprising:

6 acquiring means for acquiring first program data,
7 first additional data corresponding to the first program
8 data, a broadcast time period of the first program data,
9 second program data to be broadcast before the first program

10 data, second additional data corresponding to the second
11 program data, and a broadcast time period of the second
12 program data;

13 judging means for judging, for each of the broadcast
14 time period of the first program data and the broadcast
15 time period of the second program data, whether the
16 broadcast time period is shorter than a predetermined
17 criterion time period;

18 multiplexing means for,

19 (a) in a first case where the broadcast time period
20 of the first program data is shorter than the predetermined
21 criterion time period and the broadcast time period of
22 the second program data is no shorter than the predetermined
23 criterion time period, repeatedly multiplexing the second
24 additional data with the second program data until a
25 specific time, repeatedly multiplexing the first
26 additional data with the second program data from the
27 specific time to a start of the broadcast time period of
28 the first program data, and repeatedly multiplexing the
29 first additional data with the first program data during
30 the broadcast time period of the first program data, the
31 specific time being a point in time before the start of
32 the broadcast time period of the first program data, and
33 a time period between the specific time and the start of
34 the broadcast time period of the first program data being
35 a predetermined time period,

36 (b) in a second case where the broadcast time period

37 of the first program data and the broadcast time period
38 of the second program data are each shorter than the
39 predetermined criterion time period, repeatedly
40 multiplexing the second additional data and the first
41 additional data with the second program data from the
42 specific time to the start of the broadcast time period
43 of the first program data and repeatedly multiplexing the
44 first additional data with the first program data during
45 the broadcast time period of the first program data, and

46 (c) in a third case where the broadcast time period
47 of the first program data is no shorter than the
48 predetermined criterion time period, regardless of whether
49 the broadcast time period of the second program data is
50 shorter than the predetermined criterion time period,
51 repeatedly multiplexing the second additional data with
52 the second program data until the start of the broadcast
53 time period of the first program data and repeatedly
54 multiplexing the first additional data with the first
55 program data during the broadcast time period of the first
56 program data; and

57 broadcasting means for broadcasting the data
58 multiplexed by the multiplexing means.

1 34. The broadcast apparatus of claim 33, wherein
2 the multiplexing means

3 (a) repeatedly multiplexes the second additional
4 data with the second program data until the specific time

5 so that a bandwidth for the second additional data is
6 allocated to a predetermined bandwidth,

7 (b) in the first case, repeatedly multiplexes the
8 first additional data with the second program data from
9 the specific time to the start of the broadcast time period
10 of the first program data so that a bandwidth for the first
11 additional data is allocated to the predetermined bandwidth,
12 and

13 (c) in the second case, repeatedly multiplexes the
14 second additional data and the first additional data with
15 the second program data from the specific time to the start
16 of the broadcast time period of the first program data
17 so that a total bandwidth for the first additional data
18 and the first additional data is allocated to the
19 predetermined bandwidth.

1 35. The broadcast apparatus of claim 33, wherein
2 the multiplexing means

3 (a) repeatedly multiplexes the second additional
4 data with the second program data until the specific time
5 so that a bandwidth for the second additional data is
6 allocated to a predetermined bandwidth,

7 (b) in the first case, repeatedly multiplexes the
8 first additional data with the second program data from
9 the specific time to the start of the broadcast time period
10 of the first program data so that a bandwidth for the first
11 additional data is allocated to the predetermined bandwidth,

12 and

13 (c) in the second case, repeatedly multiplexes the
14 second additional data and the first additional data with
15 the second program data from the specific time to the start
16 of the broadcast time period of the first program data
17 so that a total bandwidth for the first additional data
18 and the first additional data is increased by adding a
19 bandwidth for the first additional data to the
20 predetermined bandwidth.

1 36. A broadcast apparatus for multiplexing and broadcasting
2 program data which is to be reproduced by a reception
3 apparatus soon after receipt and additional data which
4 corresponds to the program data, the broadcast apparatus
5 comprising:

6 acquiring means for acquiring first program data,
7 first additional data corresponding to the first program
8 data, a broadcast time period of the first program data,
9 second program data which is to be broadcast before the
10 first program data, and second additional data
11 corresponding to the second program data;

12 accepting means for accepting, from an outside,
13 judgement on whether multiplexing for the first additional
14 data is to be started at a specific time or a start time
15 of the broadcast time period, the specific time being a
16 point in time before the start of the broadcast time period,
17 and a time period between the specific time and the start

18 of the broadcast time period being a predetermined time
19 period;

20 multiplexing means for,

21 (a) in a first case that the accepting means accepts
22 judgement that the multiplexing for the first additional
23 data is to be started at the specific time, repeatedly
24 multiplexing the second additional data with the second
25 program data until the specific time, repeatedly
26 multiplexing the first additional data with the second
27 program data from the specific time to the start of the
28 broadcast time period, and repeatedly multiplexing the
29 first additional data with the first program data during
30 the broadcast time period, and

31 (b) in a second case that the accepting means accepts
32 judgement that the multiplexing for the first additional
33 data is to be started at the start time, repeatedly
34 multiplexing the second additional data with the second
35 program data until the start of the broadcast time period
36 and repeatedly multiplexing the first additional data with
37 the first program data during the broadcast time period;
38 and

39 broadcasting means for broadcasting the data
40 multiplexed by the multiplexing means.

1 37. The broadcast apparatus of claim 36,

2 wherein the multiplexing means

3 (a) repeatedly multiplexes the second additional

4 data with the second program data until the specific time
5 so that a bandwidth for the second additional data is
6 allocated to a predetermined bandwidth, and

7 (b) in the first case, repeatedly multiplexes the
8 first additional data with the second program data from
9 the specific time to the start of the broadcast time period
10 of the first program data so that a bandwidth for the first
11 additional data is allocated to the predetermined
12 bandwidth.

1 38. A broadcast apparatus for multiplexing and broadcasting
2 program data which is to be reproduced by a reception
3 apparatus soon after receipt and additional data which
4 corresponds to the program data, the broadcast apparatus
5 comprising:

6 acquiring means for acquiring first program data,
7 first additional data corresponding to the first program
8 data, a broadcast time period of the first program data,
9 second program data which is to be broadcast before the
10 first program data, and second additional data
11 corresponding to the second program data;

12 accepting means for accepting, from an outside,
13 judgement on whether multiplexing for the second additional
14 data is to be continued until the start of the broadcast
15 time period;

16 multiplexing means for,

17 (a) in a first case that the accepting means accepts

18 judgement that the multiplexing for the second additional
19 data is not to be continued until the start of the broadcast
20 time period, repeatedly multiplexing the second additional
21 data with the second program data until the specific time,
22 repeatedly multiplexing the first additional data with
23 the second program data from the specific time to the start
24 of the broadcast time period, and repeatedly multiplexing
25 the first additional data with the first program data during
26 the broadcast time period, and

27 (b) in a second case that the accepting means accepts
28 judgement that multiplexing for the second additional data
29 is to be continued until the start of the broadcast time
30 period, repeatedly multiplexing the second additional data
31 and the first additional data with the second program data
32 from the specific time to the start of the broadcast time
33 period and repeatedly multiplexing the first additional
34 data with the first program data during the broadcast time
35 period; and

36 broadcasting means for broadcasting the data
37 multiplexed by the multiplexing means.

1 39. The broadcast apparatus of claim 38, wherein

2 the multiplexing means

3 (a) repeatedly multiplexes the second additional
4 data with the second program data until the specific time
5 so that a bandwidth for the second additional data is
6 allocated to a predetermined bandwidth,

7 (b) in the first case, repeatedly multiplexes the
8 first additional data with the second program data from
9 the specific time to the start of the broadcast time period
10 so that a bandwidth for the first additional data is
11 allocated to the predetermined bandwidth, and

12 (c) in the second case, repeatedly multiplexes the
13 second additional data and the first additional data with
14 the second program data from the specific time to the start
15 of the broadcast time period so that a total bandwidth
16 for the first additional data and the first additional
17 data is increased by adding a bandwidth for the first
18 additional data to the predetermined bandwidth.

1 40. The broadcast apparatus of claim 38, wherein

2 the multiplexing means

3 (a) repeatedly multiplexes the second additional
4 data with the second program data until the specific time
5 so that a bandwidth for the second additional data is
6 allocated to a predetermined bandwidth,

7 (b) in the first case, repeatedly multiplexes the
8 first additional data with the second program data from
9 the specific time to the start of the broadcast time period
10 so that a bandwidth for the first additional data is
11 allocated to the predetermined bandwidth, and

12 (c) in the second case, repeatedly multiplexes the
13 second additional data and the first additional data with
14 the second program data from the specific time to the start

15 of the broadcast time period so that a total bandwidth
16 for the first additional data and the first additional
17 data is increased by adding a bandwidth for the first
18 additional data to the predetermined bandwidth.

1 41. The broadcast apparatus of any of claim 36, 37, 38,
2 39, and 40,
3 wherein the accepting means further accepts, from
4 the outside, an indication of the predetermined time
5 period.

1 42. A reception apparatus for receiving and reproducing
2 broadcast data which is repeatedly broadcast on a
3 predetermined bandwidth, the reception apparatus
4 comprising:

5 receiving means for receiving first broadcast data
6 to be reproduced during a reproduction time period, the
7 first broadcast data being repeatedly broadcast from a
8 point of a predetermined time period before a start of
9 the reproduction time period to an end of the reproduction
10 time period;

11 caching means for caching the first broadcast data
12 until the start of the reproduction time period when the
13 first broadcast data is received during the predetermined
14 time period; and

15 reproducing means for reproducing the cached first
16 broadcast data when the first broadcast data has been cached

17 by the caching means.

1 43. The reception apparatus of claim 42, wherein
2 the receiving means further receives
3 a cache instruction to accumulate the first
4 broadcast data before the start of the reproduction time
5 period and
6 a reproduction instruction to reproduce, during the
7 reproduction time period, (a) when the first broadcast
8 data has been accumulated, the accumulated first broadcast
9 data and (b) when the first broadcast data has not been
10 accumulated, the received first broadcast data,
11 the caching means accumulates the first broadcast
12 data before the start of the reproduction time period,
13 according to the cache instruction and
14 the reproducing means reproduces, during the
15 reproduction time period, (a) when the first broadcast
16 data has been accumulated, the accumulated first broadcast
17 data, and (b) when the first broadcast data is not
18 accumulated, the first broadcast data which is received
19 by the receiving means, according to the reproduction
20 instruction.

1 44. The reception apparatus of claim 42, wherein
2 the receiving means further receives
3 a cache instruction to store the first broadcast
4 data into a cache memory when the first broadcast data

5 has been stored in a predetermined storage medium before
6 the start of the reproduction time period and

7 a reproduction instruction to reproduce, during the
8 reproduction time period, (a) when the first broadcast
9 data has been stored in the cache memory, the cached first
10 broadcast data and (b) when the first broadcast data has
11 not been stored in the cache memory, the first broadcast
12 data received by the receiving means or the first broadcast
13 data stored in the predetermined storage medium,

14 the caching means stores the first broadcast data
15 into the cache memory before the start of the reproduction
16 time period, according to the cache instruction, and

17 the reproducing means reproduces, during the
18 reproduction time period, (a) when the first broadcast
19 data has been stored in the cache memory, the first broadcast
20 data stored in the cache memory, and (b) when the first
21 broadcast data is not stored in the cache memory, the first
22 broadcast data stored in the predetermined storage medium
23 or the first broadcast data received by the receiving means,
24 according to the reproduction instruction.

1 45. A reception apparatus for receiving multiplexed data
2 which is made up of program data which is to be reproduced
3 by a reception apparatus soon after receipt and additional
4 data which corresponds to the program data so that a total
5 bandwidth is allocated to a predetermined bandwidth, the
6 reception apparatus comprising:

7 receiving means for repeatedly receiving
8 (a) multiplexed data which is made up of first
9 additional data corresponding to first program data and
10 second program data, from a point of a predetermined time
11 period before a start of a broadcast time period in which
12 the first program data is to be reproduced to an end of
13 the broadcast time period, the second program data being
14 to be reproduced before the first program data, and
15 (b) multiplexed data which is made up of the first
16 additional data and the first program data, during the
17 broadcast time period;
18 reproducing means for reproducing the first program
19 data during the broadcast time period;
20 caching means for caching the first additional data
21 until the start of the broadcast time period when the
22 receiving means receives the multiplexed data including
23 the first additional data during the predetermined time
24 period; and
25 using means for using the cached first additional
26 data when the first additional data has been cached by
27 the caching means.

1 46. The reception apparatus of claim 45, wherein
2 the receiving means further receives
3 a cache instruction to accumulate the first
4 additional data before the start of the broadcast time
5 period and

6 a use instruction to use, during the broadcast time
7 period, (a) when the first broadcast data has not been
8 accumulated, the accumulated first additional data when
9 the first additional data has been accumulated and (b)
10 when the first additional data has not been accumulated,
11 the received first additional data,

12 the caching means accumulates the first additional
13 data before the start of the broadcast time period,
14 according to the cache instruction, and

15 the using means uses, during the broadcast time
16 period, (a) when the first additional data has been
17 accumulated, the accumulated first additional data, and
18 (b) when the first additional data is not accumulated,
19 the first additional data which is received by the receiving
20 means, according to the use instruction.

1 47. The reception apparatus of claim 45, wherein

2 the receiving means further receives

3 a cache instruction to cache the first additional
4 data when the first additional data has been stored in
5 a predetermined storage medium before the start of the
6 broadcast time period and

7 a use instruction to use, during the broadcast time
8 period, (a) when the first additional data has been stored
9 in the cache memory, the first additional data stored in
10 the cache memory and (b) when the first additional data
11 has not been stored in the cache memory, the first additional

12 data received by the receiving means or the first additional
13 data stored in the predetermined storage medium,

14 the caching means stores the first additional data
15 into the cache memory before the start of the broadcast
16 time period, according to the cache instruction, and

17 the using means uses, during the broadcast time
18 period, (a) when the first additional data has been stored
19 in the cache memory, the first additional data stored in
20 the cache memory, and (b) when the first additional data
21 is not stored in the cache memory, the first additional
22 data stored in the predetermined storage medium or the
23 first additional data received by the receiving means,
24 according to the use instruction.

1 48. A broadcast method for broadcasting broadcast data
2 comprising:

3 an acquiring step for acquiring first broadcast data
4 and a reproduction time period in which the first broadcast
5 data is to be reproduced by a reception apparatus; and

6 a broadcasting step for repeatedly broadcasting the
7 first broadcast data from a specific time to an end of
8 the reproduction time period, the specific time being a
9 point in time before a start of the reproduction time period,
10 and a time period between the specific time and the start
11 of the reproduction time period being a predetermined time
12 period.

1 49. A broadcast method for multiplexing and broadcasting
2 program data which is to be reproduced by a reception
3 apparatus soon after receipt and additional data which
4 corresponds to the program data, the broadcast method
5 comprising:

6 an acquiring step for acquiring first program data,
7 first additional data corresponding to the first program
8 data, a broadcast time period of the first program data,
9 and second program data which is to be broadcast before
10 the first program data;

11 a multiplexing step for repeatedly multiplexing the
12 first additional data with the second program data from
13 a specific time to a start of the broadcast time period
14 and repeatedly multiplexing the first additional data with
15 the first program data during the broadcast time period,
16 the specific time being a point in time before the start
17 of the broadcast time period, and a time period between
18 the specific time and the start of the broadcast time period
19 being a predetermined time period; and

20 a broadcasting step for broadcasting the data
21 multiplexed in the multiplexing step.

1 50. A broadcast method for multiplexing and broadcasting
2 program data which is to be reproduced by a reception
3 apparatus soon after receipt and additional data
4 corresponding to the program data, the broadcast method
5 comprising:

6 an acquiring step for acquiring first program data,
7 first additional data corresponding to the first program
8 data, a broadcast time period of the first program data,
9 second program data to be broadcast before the first program
10 data, second additional data corresponding to the second
11 program data, and a broadcast time period of the second
12 program data;

13 a judging step for judging, for each of the broadcast
14 time period of the first program data and the broadcast
15 time period of the second program data, whether the
16 broadcast time period is shorter than a predetermined
17 criterion time period;

18 a multiplexing step for,

19 (a) in a first case where the broadcast time period
20 of the first program data is shorter than the predetermined
21 criterion time period and the broadcast time period of
22 the second program data is no shorter than the predetermined
23 criterion time period, repeatedly multiplexing the second
24 additional data with the second program data until a
25 specific time, repeatedly multiplexing the first
26 additional data with the second program data from the
27 specific time to a start of the broadcast time period of
28 the first program data, and repeatedly multiplexing the
29 first additional data with the first program data during
30 the broadcast time period of the first program data, the
31 specific time being a point in time before the start of
32 the broadcast time period of the first program data, and

33 a time period between the specific time and the start of
34 the broadcast time period of the first program data being
35 a predetermined time period,

36 (b) in a second case where the broadcast time period
37 of the first program data and the broadcast time period
38 of the second program data are each shorter than the
39 predetermined criterion time period, repeatedly
40 multiplexing the second additional data and the first
41 additional data with the second program data from the
42 specific time to the start of the broadcast time period
43 of the first program data and repeatedly multiplexing the
44 first additional data with the first program data during
45 the broadcast time period of the first program data, and

46 (c) in a third case where the broadcast time period
47 of the first program data is no shorter than the
48 predetermined criterion time period, regardless of whether
49 the broadcast time period of the second program data is
50 shorter than the predetermined criterion time period,
51 repeatedly multiplexing the second additional data with
52 the second program data until the start of the broadcast
53 time period of the first program data and repeatedly
54 multiplexing the first additional data with the first
55 program data during the broadcast time period of the first
56 program data; and

57 a broadcasting step for broadcasting the data
58 multiplexed in the multiplexing step.

1 51. A reception method for receiving and reproducing
2 broadcast data which is repeatedly broadcast on a
3 predetermined bandwidth, the reception method comprising:
4 a receiving step for receiving first broadcast data
5 to be reproduced during a reproduction time period, the
6 first broadcast data being repeatedly broadcast from a
7 predetermined time period before a start of the
8 reproduction time period to an end of the reproduction
9 time period;

10 a caching step for caching the first broadcast data
11 until the start of the reproduction time period when the
12 first broadcast data is received during the predetermined
13 time period; and

14 a reproducing step for reproducing the cached first
15 broadcast data when the first broadcast data has been cached
16 by the caching step.

1 52. A broadcast method for receiving multiplexed data which
2 is made up of program data which is to be reproduced by
3 a reception apparatus soon after receipt and additional
4 data which corresponds to the program data so that a total
5 bandwidth is allocated to a predetermined bandwidth, the
6 reception method comprising:

7 a receiving step for repeatedly receiving

8 (a) multiplexed data which is made up of first
9 additional data corresponding to first program data and
10 second program data, from a predetermined time period

11 before a start of a broadcast time period in which the
12 first program data is to be reproduced to an end of the
13 broadcast time period, the second program data being to
14 be reproduced before the first program data, and

15 (b) multiplexed data which is made up of the first
16 additional data and the first program data, during the
17 broadcast time period;

18 a reproducing step for reproducing the first program
19 data during the broadcast time period;

20 a caching step for caching the first additional data
21 until the start of the broadcast time period when the
22 multiplexed data including the first additional data is
23 received during the predetermined time period in the
24 receiving step; and

25 a using step for using the cached first additional
26 data when the first additional data has been cached in
27 the caching step.

1 53. A broadcast program for broadcasting broadcast data,
2 the broadcast program having a computer execute:

3 an acquiring step for acquiring first broadcast data
4 and a reproduction time period in which the first broadcast
5 data is to be reproduced by a reception apparatus; and

6 a broadcasting step for repeatedly broadcasting the
7 first broadcast data from a specific time to an end of
8 the reproduction time period, the specific time being a
9 point in time before a start of the reproduction time period,

10 and a time period between the specific time and the start
11 of the reproduction time period being a predetermined time
12 period.

1 54. A broadcast program for multiplexing and broadcasting
2 program data which is to be reproduced by a reception
3 apparatus soon after receipt and additional data which
4 corresponds to the program data, the broadcast program
5 having a computer execute:

6 an acquiring step for acquiring first program data,
7 first additional data corresponding to the first program
8 data, a broadcast time period of the first program data,
9 and second program data which is to be broadcast before
10 the first program data;

11 a multiplexing step for repeatedly multiplexing the
12 first additional data with the second program data from
13 a specific time to a start of the broadcast time period
14 and repeatedly multiplexing the first additional data with
15 the first program data during the broadcast time period,
16 the specific time being a point in time before the start
17 of the broadcast time period, and a time period between
18 the specific time and the start of the broadcast time period
19 being a predetermined time period; and

20 a broadcasting step for broadcasting the data
21 multiplexed in the multiplexing step.

1 55. A broadcast program for multiplexing and broadcasting

2 program data which is to be reproduced by a reception
3 apparatus soon after receipt and additional data
4 corresponding to the program data, the broadcast program
5 having a computer execute:

6 an acquiring step for acquiring first program data,
7 first additional data corresponding to the first program
8 data, a broadcast time period of the first program data,
9 second program data to be broadcast before the first program
10 data, second additional data corresponding to the second
11 program data, and a broadcast time period of the second
12 program data;

13 a judging step for judging, for each of the broadcast
14 time period of the first program data and the broadcast
15 time period of the second program data, whether the
16 broadcast time period is shorter than a predetermined
17 criterion time period;

18 a multiplexing step for,

19 (a) in a first case where the broadcast time period
20 of the first program data is shorter than the predetermined
21 criterion time period and the broadcast time period of
22 the second program data is no shorter than the predetermined
23 criterion time period, repeatedly multiplexing the second
24 additional data with the second program data until a
25 specific time, repeatedly multiplexing the first
26 additional data with the second program data from the
27 specific time to a start of the broadcast time period of
28 the first program data, and repeatedly multiplexing the

29 first additional data with the first program data during
30 the broadcast time period of the first program data, the
31 specific time being a point in time before the start of
32 the broadcast time period of the first program data, and
33 a time period between the specific time and the start of
34 the broadcast time period of the first program data being
35 a predetermined time period,

36 (b) in a second case where the broadcast time period
37 of the first program data and the broadcast time period
38 of the second program data are each shorter than the
39 predetermined criterion time period, repeatedly
40 multiplexing the second additional data and the first
41 additional data with the second program data from the
42 specific time to the start of the broadcast time period
43 of the first program data and repeatedly multiplexing the
44 first additional data with the first program data during
45 the broadcast time period of the first program data, and

46 (c) in a third case where the broadcast time period
47 of the first program data is no shorter than the
48 predetermined criterion time period, regardless of whether
49 the broadcast time period of the second program data is
50 shorter than the predetermined criterion time period,
51 repeatedly multiplexing the second additional data with
52 the second program data until the start of the broadcast
53 time period of the first program data and repeatedly
54 multiplexing the first additional data with the first
55 program data during the broadcast time period of the first

56 program data; and
57 a broadcasting step for broadcasting the data
58 multiplexed in the multiplexing step.

1 56. A reception program for receiving and reproducing
2 broadcast data which is repeatedly broadcast on a
3 predetermined bandwidth, the reception program having a
4 computer execute:

5 a receiving step for receiving first broadcast data
6 to be reproduced during a reproduction time period, the
7 first broadcast data being repeatedly broadcast from a
8 predetermined time period before a start of the
9 reproduction time period to an end of the reproduction
10 time period;

11 a caching step for caching the first broadcast data
12 until the start of the reproduction time period when the
13 first broadcast data is received during the predetermined
14 time period; and

15 a reproducing step for reproducing the cached first
16 broadcast data when the first broadcast data has been cached
17 by the caching step.

1 57. A reception program for receiving multiplexed data
2 which is made up of program data which is to be reproduced
3 by a reception apparatus soon after receipt and additional
4 data which corresponds to the program data so that a total
5 bandwidth is allocated to a predetermined bandwidth, the

6 reception program having a computer execute:
7 a receiving step for repeatedly receiving
8 (a) multiplexed data which is made up of first
9 additional data corresponding to first program data and
10 second program data, from a predetermined time period
11 before a start of a broadcast time period in which the
12 first program data is to be reproduced to an end of the
13 broadcast time period, the second program data being to
14 be reproduced before the first program data, and
15 (b) multiplexed data which is made up of the first
16 additional data and the first program data, during the
17 broadcast time period;
18 a reproducing step for reproducing the first program
19 data during the broadcast time period;
20 a caching step for caching the first additional data
21 until the start of the broadcast time period when the
22 multiplexed data including the first additional data is
23 received during the predetermined time period in the
24 receiving step; and
25 a using step for using the cached first additional
26 data when the first additional data has been cached in
27 the caching step.